

Is the *Carcinus maenas* population endangered due to competition with the invasive crabs, *Hemigrapsus* spp.?

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Being the consequence of the rise of maritime trade, the introduction of invasive species is one of the most important human perturbations disrupting coastal ecosystems, together with fishing, pollution, destruction of habitats and climate change (Jackson *et al.*, 2001). Invasive species can change the structure and the functioning of marine ecosystems (Grosholz, 2002) at all biological levels (genome, individual, population, species, communities and ecosystem) via predation, parasitism, pathogenic transfers, physical and chemical modifications of habitats (Beisel and Lévêque, 2010). Among the alien species identified in France, *Hemigrapsus takanoi* (Asakura and Watanabe, 2005) and *Hemigrapsus sanguineus* (De Haan, 1835), native from the north-western Pacific, have been reported on the intertidal zone of the French coast. Nowadays, they are observed from Mount-Saint-Michel Bay to the Belgium border (Dauvin and Dufossé, 2011; Gothland *et al.*, in revision). Locally, the endemic species *Carcinus maenas*, seems to regress in favour to *Hemigrapsus* species (e.g. Opal coast) but this is not a generality and the success of invasion does not appear uniform along the coast (e.g. *C. maenas* remains largely dominant in south of Boulogne-sur-Mer, to the Normandy and along the western coast of Cotentin). In this context, several reasons for this heterogeneity of the success of the invasion were identified by (i) studying the dynamics and biological traits of each species but also (ii) evaluating their food preferences. Thus, crab populations from five study sites were surveyed during 13 months. Thus, the densities, the ecological characteristics of their habitat (sediment nature), the breeding season and the period of recruitment, the sexual maturity and the longevity were evaluated. The fatty acids (FA) and stable carbon and nitrogen isotopic ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$) compositions of crabs and of several sources (11 including algae, gastropods, bivalves and polychaetes) were seasonally investigated to evaluate the food preferences of *C. maenas* and *Hemigrapsus*. We showed that *H. sanguineus* and *H. takanoi*, through their demographic behaviours corresponded to population with a “r-selected strategy” either more competitive for the conquest of the space than population with a “k-selected strategy” as *C. maenas*. We also underlined the presence of an interspecific competition for resource and the importance of the combination of density-dependent cannibalism and space competition in the nursery area of *C. maenas*, which contribute to the success of the *Hemigrapsus*.

References

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